

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace all prior versions and listings of claims in the application:

1. (CURRENTLY AMENDED) A phase contrast radiographic image processing apparatus comprising:
  - a radiation generation source;
  - at least one radiation detector to capture a phase contrast radiographic image of an object, wherein a distance between the radiation generation source and the at least one radiation detector equals  $R1 + R2$ , where  $R1$  is defined to be a distance between the radiation generation source and the object to be radiographed, and satisfying the formula:  $10 > R1 \geq (D-7)/200$  (in meters), where  $D$  is a focal spot size of the ray generated from the radiation generation source (in  $\mu\text{m}$ ), and  $R2$  is defined to be a distance between the object to be radiographed and the at least one radiation detector and satisfying the formula:  $R2 \geq 0.15$  (in meters), so that the size of the phase contrast radiographic image is larger than the object by a magnification factor of  $1 + R2/R1$ ;
  - a management information storing section to store management information regarding a radiography; and
  - an image processing section to apply an image processing onto a captured phase contrast radiographic image, ~~produced by the phase contrast radiography~~ wherein the image processing section determines an image processing condition based on the management information stored in the management information storing section and conducts the image processing based on the determined image processing condition.

2. (Original) The phase contrast radiographic image processing apparatus of claim 1, wherein the management information indicates information regarding radiography for an object to be radiographed and an identification of the object.

3. (Currently Amended) The phase contrast radiographic processing apparatus of claim 2, wherein the information regarding the radiography includes at least one of the following pieces of information: a section to be radiographed, a radiographing attitude, a radiographing method, a radiographing condition, a kind of a radiation image such as a phase contrast radiographic image or an ordinary radiographic image, a sampling pitch in a detector, and an object of a diagnosis.

4. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 3, wherein the radiographing condition includes at least one of the following conditions: a tube current, a positional relationship among a radiation date, an X-ray tube and an object to be radiographed, ~~an enlargement ratio~~ the magnification factor, and information whether or not a grid to eliminate scattered X-rays is used.

5. (Currently Amended). The phase contrast radiographic image processing apparatus of claim 1, further comprising:

an interest region setting section to set a desired interest region by analyzing the phase contrast radiographic image;

wherein the image processing section determines the image processing condition based on image signals in the desired interest region set by the interest region setting section.

6. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 3, wherein the image processing [[means]] section comprises a gradation processing section to conduct a process to convert gradation.

7. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 6, wherein the image processing [[means]] section comprises a gradation conversion curve storing section to store plural gradation conversion curves and the gradation processing section selects one of the plural gradation conversion curves stored in the gradation conversion curve storing section and conducts the process to convert gradation based on the selected gradation conversion curve.

8. (Original) The phase contrast radiographic image processing apparatus of claim 7, wherein the gradation processing section selects the one of the plural gradation conversion curves stored in the gradation conversion curve storing section based on the management information regarding the radiography.

9. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 6, wherein the image processing [[means]] section further comprises a reference gradation conversion curve storing section to store plural reference gradation conversion curves and the gradation processing section selects one of the plural reference gradation conversion curves stored in the reference gradation conversion curve storing section, modifies the selected reference gradation conversion curve so as to produce a desired gradation conversion curve, and conducts the process to convert gradation based on the desired gradation conversion curve.

10. (Currently Amended) The phase contrast radiographic image processing apparatus of claim [[6]] 9, wherein the gradation processing section selects [[the]] one of the plural reference gradation conversion curves stored in the reference gradation conversion curve storing section based on the management information regarding the radiography.

11. (Original) The phase contrast radiographic image processing apparatus of claim 1, wherein the image processing section comprises a frequency enhancement processing section to determine a frequency enhancement processing condition based on the management information regarding the radiography and to conduct a frequency enhancement processing.

12. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 1, wherein the image processing section comprises a dynamic range compression processing section to determine[[s]] a dynamic range compression processing condition based on the management information regarding the radiography and to conduct a dynamic range compression processing.

13. (Original) The phase contrast radiographic image processing apparatus of claim 1 further comprising a radiation image detecting section to output image signals corresponding to a captured phase contrast radiographic image.

14. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 1, further comprising an output section to reduce the output a phase

contrast radiographic image with a reduction ratio  $\alpha$  and to output the reduced  
phase contrast radiographic image ~~size of the radiographed object.~~

15. (Cancelled)

16. (Original) The phase contrast radiographic image processing apparatus of claim 14, wherein the reduction ratio is a coefficient determined based on the management information.

17. (Currently Amended) The phase contrast radiographic image processing apparatus of claim ~~[[16]]~~14, wherein the management information includes the magnification factor, and the reduction ratio is determined based on ~~an enlargement ratio of the phase control method radiation image contained in the management information~~ the magnification factor.

18. (Original) The phase contrast radiographic image processing apparatus of claim 16, wherein the reduction ratio is changeable.

19. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 14, wherein the output section outputs the reduced phase contrast radiographic image with ~~[[the]]~~ a size equal to that of the ~~radiographed object.~~

20. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 14 further comprising:

an interpolation processing condition storing section to store plural interpolation processing conditions,  
wherein the output section selects one of the plural interpolation processing conditions stored in the interpolation processing condition storing section and conducts an interpolation process based on the selected interpolation processing condition.

21. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 20, wherein the interpolation process is one of the following types of interpolation processes: a nearest interpolation, a spline interpolation, a cubic convolution interpolation, and a bell spline interpolation.

22. (Original) The phase contrast radiographic image processing apparatus of claim 20, wherein the output section determines the interpolation processing condition based on the management information regarding the radiography stored in a radiography information storing section.

23. (Currently Amended) The phase contrast radiographic image processing apparatus of claim ~~[[14]]~~ 20, further comprising:

an input section to input the phase contrast radiographic image and a sampling pitch,

wherein the output section has a sampling pitch and conducts the interpolation processing based on information of ~~[[a]]~~ the sampling pitch of the input section, ~~[[a]]~~ the sampling pitch of the output section and ~~a enlargement ratio~~ the magnification factor of

the phase contrast radiographic image and outputs the phase contrast radiographic image with the size equal to that of the ~~radiographed~~ object.

24. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 14, wherein the output section outputs the reduced phase contrast radiographic image together with designated information ~~designated among from~~ the management information regarding the radiography stored in a radiography information storing section.

25. (Currently Amended) A phase contrast radiographic image processing apparatus, comprising:

an image processing section, comprising:

a first-phase contrast image processing section to apply an image processing onto a phase contrast radiographic image based on a first image processing condition; and

~~a second~~ an ordinary radiographic image processing section to apply an image processing onto an ordinary radiographic image based on a second image processing condition different from the first image processing condition;

a gradation processing section to conduct a process to convert gradation;  
and

a reference gradation conversion curve storing section to store plural reference gradation conversion curves, wherein the gradation processing section selects one of the plural reference gradation conversion curves stored in the reference gradation conversion curve storing section, modifies the selected reference gradation conversion curve so as to produce a desired gradation conversion curve, and conducts

the process to convert gradation based at least on the desired gradation conversion curve.

26. (Original) The phase contrast radiographic image processing apparatus of claim 25, further comprising:

a interest region setting section to set a desired interest region by analyzing the phase contrast radiographic image;

wherein the image processing section determines the image processing condition based on image signals in the interest region set by the interest region setting section.

27. (Cancelled)

28. (Currently Amended) The phase contrast radiographic image processing apparatus of claim [[27]] 25, wherein the image processing [[means]] section further comprises a gradation conversion curve storing section to store plural gradation conversion curves and the gradation processing section selects one of the plural gradation conversion curves stored in the gradation conversion curve storing section and conducts the process to convert gradation based at least on the selected gradation conversion curve or the desired gradation conversion curve.

29. (Cancelled)

30. (Currently Amended) The phase contrast radiographic image processing apparatus of claim [[27]] 25, wherein the gradation processing section conducts



processing ~~on a condition that~~ if a contrast coefficient for the phase contrast radiographic image is smaller than that for the ordinary radiographic image.

31. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 25, wherein the image processing section further comprises a frequency enhancement processing section to conduct a frequency enhancement processing.

32. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 31, wherein the frequency enhancement processing section conducts processing ~~on a condition that~~ if a frequency enhancement coefficient for the phase contrast radiographic image is smaller than that for the ordinary radiographic image.

33. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 25, wherein the image processing section further comprises a dynamic range compression processing section to conduct a dynamic range compression processing.

34. (Currently Amended) The phase contrast radiographic image processing apparatus of claim 33, wherein the dynamic range compression processing section conducts processing ~~on a condition that~~ if a degree of correction for the phase contrast radiographic image is larger than that for the ordinary radiographic image.

35. (Original) The phase contrast radiographic image processing apparatus of claim 25, further comprising a radiation image detecting section to output image signals corresponding to a captured phase contrast radiographic image.

36. - 44. (Cancelled)